National Semiconductor

ADVANCED INFORMATION

54F/74F674
16-Bit Serial/Parallel-In, Serial-Out Shift Register

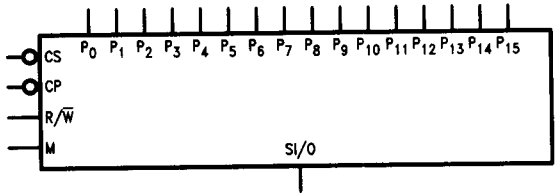
General Description

The 'F674 is a 16-bit shift register with serial and parallel load capability and serial output. A single pin serves alternately as an input for serial entry or as a TRI-STATE® serial output. In the serial-out mode the data recirculates in the register. Chip Select, Read/Write and Mode inputs provide control flexibility.

Features

- 16-Bit serial I/O shift register
- 16-Bit parallel-in, serial-out converter
- Recirculating serial shifting
- Common serial data I/O pin
- Slim 24 lead DIP

Logic Symbols



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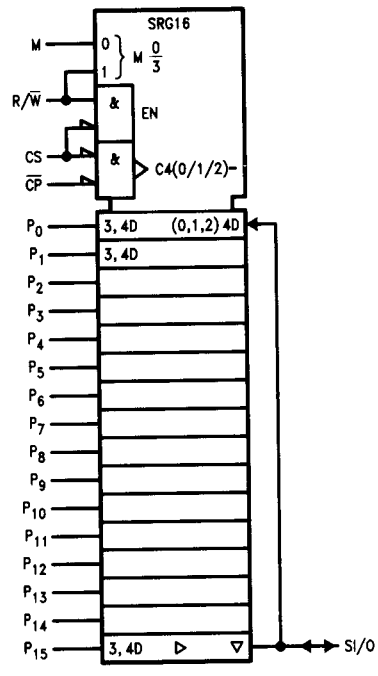
IEEE/IEC



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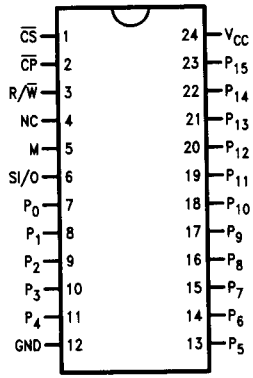
Connection Diagrams

Pin Assignment for DIP, SOIC and Flatpak



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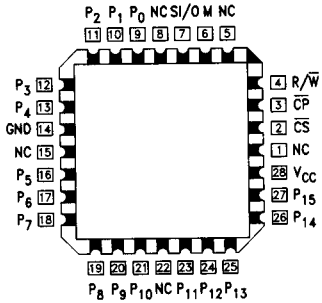
Pin Assignment for LCC and PCC



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Functional Description

The 16-bit shift register operates in one of four modes, as indicated in the Shift Register Operations Table.

Hold—a HIGH signal on the Chip Select ($\overline{CS}$) input prevents clocking and forces the Serial Input/Output (SI/O) TRI-STATE buffer into high impedance state.

Serial Load—data present on the SI/O pin shifts into the register on the falling edge of $\overline{CP}$. Data enters the Q_0 position and shifts toward Q_{15} on successive clocks.

Serial Output—the SI/O TRI-STATE buffer is active and the register contents are shifted out from Q_{15} and simultaneously shifted back into Q_0.

Parallel Load—data present on P_0–P_{15} are entered into the register on the falling edge of $\overline{CP}$. The SI/O TRI-STATE buffer is active and represents the Q_{15} output.

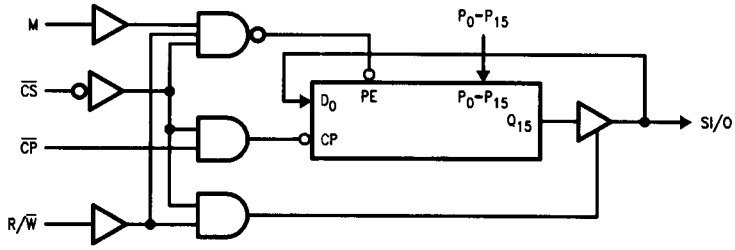
To prevent false clocking, $\overline{CP}$ must be LOW during a LOW-to-HIGH transition of $\overline{CS}$.

Shift Register Operations Table

Control Inputs				SI/O Status	Operating Mode
$\overline{CS}$	R/$\overline{W}$	$\overline{M}$	$\overline{CP}$		
H	X	X	X	High Z	Hold
L	L	X	↘	Data In	Serial Load
L	H	L	↘	Data Out	Serial Output with Recirculation
L	H	H	↘	Active	Parallel Load; No Shifting

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
↘ = HIGH-to-LOW Transition

Block Diagram



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